VBOX AUTOMOTIVE

VBOX 4

High Accuracy Data Logger Designed
For Versatility and Precision

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vboxautomotive.co.uk/vbox4

VBOX 4

VBOX 4 is engineered for versatility. It combines high accuracy data logging with ease of use and seamlessly integrates into any advanced automotive test setup, delivering a complete test solution.

100 Hz GNSS Receiver
Ensures high-resolution data collection with RTK for centimeter-level accuracy

Advanced CAN Logging
Captures entire vehicle CAN Bus, including CAN FD, for comprehensive data analysis

IMU Integration
Combines with **VBOX IMU05** to enhance data accuracy in challenging GNSS conditions

Ethernet Connectivity
Supports seamless integration with major driving robots and other testing equipment

Versatile Model Range
Three models available, each designed to meet the needs of specific test applications

Total Testing With VBOX

VBOX 4 is compatible with a wide range of **VBOX** sensors, modules and accessories to provide engineers with a comprehensive test solution.

All data can be viewed in real-time or analysed in post-process using our highly intuitive data analysis software, **VBOX TEST SUITE**.

RTK as Standard

100 Hz GNSS RTK receiver delivers cm-level accuracy when combined with an NTRIP modem or Base Station

CAN Bus Logging

Benefit from two dedicated CAN FD ports, an additional CAN Bus and a fourth Bus for **VBOX** module inputs

Brake Trigger Input

Capture the precise moment that braking starts, delivering brake stop accuracy to within +/- 1.8 cm

IMU Integration

Combines seamlessly with **VBOX IMU05** to improve data accuracy in challenging GNSS conditions

ADAS Testing

Engineered for complex ADAS testing that includes up to 5 moving and static targets, 3 road lines and 99 signposts

Robot Compatibility

Compatible with all-major driving robots for ADAS and Autonomous Vehicle testing via Ethernet connection

Advanced CAN Logging

VBOX 4 automatically captures a vehicle's entire CAN bus system, including CAN FD, without the need to pre-select channels. This ensures that no critical data is missed, eliminating the risk of re-testing and allowing for complete flexibility in data analysis.

By logging the full CAN Bus upfront, specific channels can be selected later in **VBOX TEST SUITE** analysis software. Here, data can be analysed in unlimited combinations and the pre-configured test plugins can be utilised to offer instant pass/fail results.

VBOX 4 features two independent CAN ports, giving it the ability to synchronise two separate CAN buses into a single .asc file.

GNSS / CAN Synchronisation

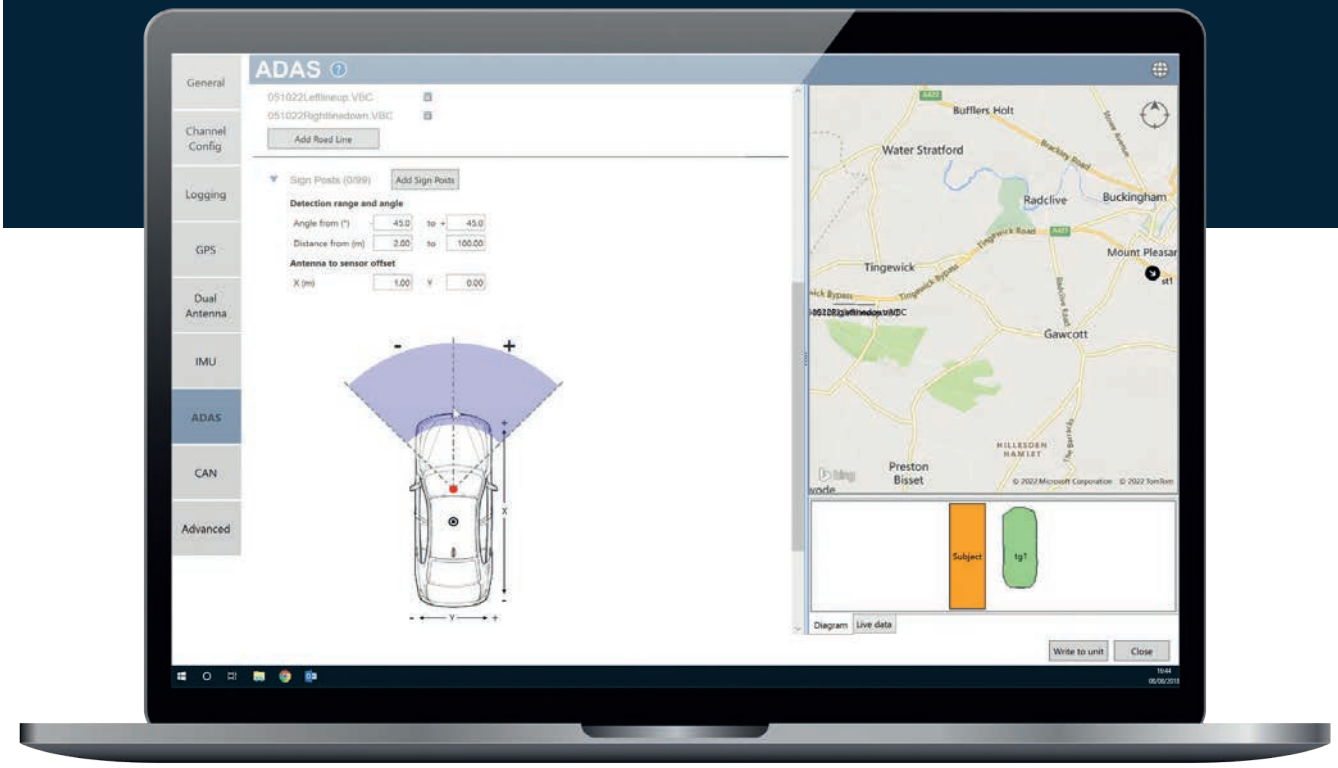
VBOX 4 delivers advanced logging capabilities, recording GNSS data at 100 Hz and providing unrestricted CAN bus logging to accommodate sensors with rapid update rates, such as suspension damper rates.

All sensor outputs are precisely synchronised with GNSS position data, ensuring accurate and reliable performance analysis.

Set-up Software

The dedicated set-up software is designed to ensure efficient and seamless configuration of the **VBOX 4**. The intuitive interface features smart illustrations that visually represent current test settings, providing clarity and reducing setup time.

With active guidance, the software offers real-time feedback, ensuring test setups are constructed correctly and will operate as required. This immediate confirmation minimises errors and enhances testing efficiency.



Driving Robot Connectivity

VBOX 4 has RTK, IMU05 compatibility and ethernet connectivity as standard, supporting seamless integration with all major driving robots.

This enables repeatable and reliable testing for a wide range of test applications from open loop tests such as ESC, to complex path follow scenarios that validate Autonomous Emergency Braking and Lane Support.

Ethernet Connectivity

High-speed Ethernet connection allows **VBOX 4** to effectively communicate with driving robots.

Robot Compatibility

Compatible with driving robots from all leading manufacturers inc. AB Dynamics, Humanetics, Vehico, Stähle and 4a.

Cost-Effective

Without compromising on accuracy, **VBOX** Motion Packs offer a cost-effective robot-integrated solution.

Motion Pack Solution

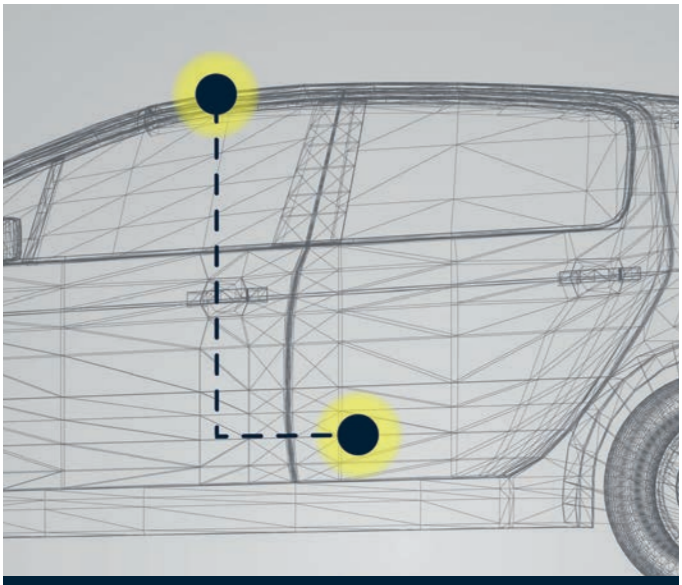
VBOX 4 provides high-precision speed, heading, and positional data, enabling a driving robot to follow a predefined path with centimeter-level accuracy. This ensures tests are conducted with absolute consistency, which is crucial for validating complex ADAS scenarios.

VBOX AUTOMOTIVE offers an extensive range of RTK-compatible devices, modules, displays, radios, and accessories, delivering a complete testing solution for users.

IMU Integration

VBOX 4 seamlessly integrates with **VBOX IMU05** to enhance data accuracy and reliability. Available in standard and advanced S versions, **VBOX IMU05** utilises advanced inertial technology to augment the GNSS capabilities of **VBOX 4**, delivering cleaner, more precise test data.

Additionally, **VBOX IMU05** adds crucial attitude channels - Yaw, Pitch, and Roll - which are essential for vehicle dynamics and ADAS testing to analyse lateral and longitudinal movements, including Slip Angle and Vehicle/Body Heading.



Translate Reference Point

VBOX IMU05 adds the ability to translate measurements away from the GNSS antenna, to any location on the vehicle such as the centre of gravity or centre of rotation. This allows for analysis at the point of interest rather than only at the vehicle roof which experiences measurement overshoot during dynamic manoeuvrers.

Mitigate GNSS Multipath

The combined use of **VBOX 4** and **IMU05** excels in environments with poor GNSS signals, such as areas prone to signal occlusion, denial, or multi-path interference. Here, the **IMU05** consistently maintains data accuracy for speed and position, even when GNSS data is compromised.

VBOX 4

VBOX 4 excels in versatility and precision. It offers a 100 Hz, RTK GNSS receiver as standard, ensuring high-resolution data collection and real-time accuracy.

It delivers exceptional performance with a velocity precision of 0.1 km/h and brake distance accuracy within ±1.8 cm. Its straightforward setup ensures ease of use, and is compliant with international standards, including EuroNCAP and NHTSA.

Brake/ Tyre Testing

Performance

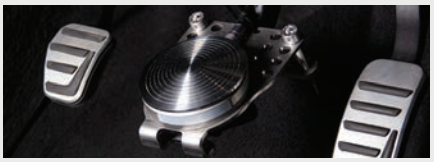
Coastdown

Pass-By Noise

VBOX 4 is an ideal choice for a wide range of automotive testing and validation from performance, brake and tyre testing to pass-by-noise and coastdown testing.

It combines with **VBOX IMU05** and wheel speed data to form an Inertial Navigation System (INS) and integrates with a wide range of equipment to form the hub of larger set-ups for specialist testing.

Total Testing With VBOX



Pedal Force Sensors

Measure force to SAE and ECE standards. The universal mount provides easy installation on all types of vehicle pedals.

Event Marker Interface

Outputs a digital signal to record and trigger the start of a test and can be easily combined with the Pedal Force Sensor.

MFD Touch

A multi-function display with a 4.3" colour touchscreen which can be used to monitor outputted data in real-time.

VBOX 4 DYNAMICS

VBOX 4 DYNAMICS has the same impressive features as **VBOX 4**, with the addition of an enhanced GNSS receiver to maintain accuracy during high dynamic manoeuvres.

Seamless integration with **VBOX IMU05** ensures this model is perfectly suited for advanced vehicle dynamics testing, delivering high accuracy measurements of body heading, slip angles, pitch and roll movements at 100 Hz.

Aquaplane

Tyre Testing

Lane Change

ESC

VBOX 4 DYNAMICS is engineered for advanced handling tests, including Aquaplane, ESC assessments, Lane Change manoeuvres, and precise Tyre Testing, providing essential data on vehicle dynamics and stability.

It is fully compatible with driving robots to deliver precise and repeatable control, and is essential for tests such as ESC testing which require high torque and steering wheel speed.

Total Testing With **VBOX**

Steering Torque Sensor

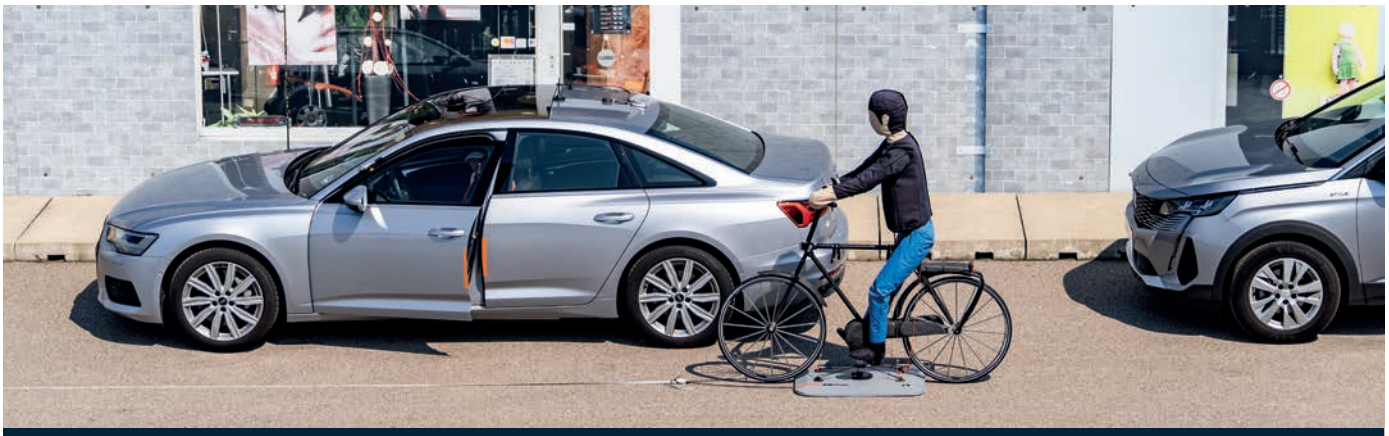
Measure steering angle or torque with this easy to install, ISO 17025 calibrated sensor. Available in 50, 100 or 200 Nm models.

Wheel Speed Sensor

Accurately measure wheel speeds up to 100 times a second. These sensors utilise wireless technology and come with universal mounting.

Base Station 6

Helps users to gain cm-level positional accuracy by calculating and transmitting differential correction data to the **VBOX 4**.



VBOX 4 ADAS

Designed for cutting-edge ADAS and autonomous vehicle testing, **VBOX 4 ADAS** supports multi-vehicle/multi-target testing, allowing for installation in both subject and target vehicles.

ADAS test setups can be customised with the vehicle under test able to simultaneously reference any combination of up to five moving and static targets, three road-line references and 99 signposts.

Collision Avoidance | Lane Assist | Safe Exit Assist | Sign Recognition

VBOX 4 ADAS is ideal for evaluating a variety of ADAS applications, such as Collision Avoidance, Lane Support, Safe Exit Assist and Sign Post Recognition.

It is compliant with all major international test standard requirements and **VBOX TEST SUITE** software offers dedicated ADAS test scenarios for intuitive data analysis.

Complete Testing Solutions

ADAS Sensors

Audio and visual sensors capture ADAS alerts to log the exact moment a vehicle safety message is presented to the driver.

NTRIP Modem

Receive RTK correction data via Internet, without having to operate your own RTK base station.

ADAS Radios

2.4 GHz radios provide base station corrections, link two or more **VBOX** units to measure vehicle separation, or transmit serial data.

Specifications

Performance

Velocity	
Accuracy	0.1 km/h
Resolution	0.01 km/h

Position	
Accuracy* (standalone)	V: 1.8 m H: 1.2 m
Accuracy* (RTK)	V: 10 mm + 0.8 ppm x baseline H: 5 mm + 0.5 ppm x baseline

Distance	
Accuracy	±0.05%
Resolution	1 cm

Attitude	IMU05	IMU05-S
Yaw Angle (RMS)	0.1°	0.07°
Pitch and Roll Angle (RMS)	0.02°	0.013°
Slip Angle*	0.15°	0.1°

GNSS

GNSS Signals	VBOX 4	VBOX 4 Dynamics / VBOX 4 ADAS
Signals Tracked	GPS: L1, L2 | GLONASS: L1, L2	GPS: L1, L2 | GLONASS: L1, L2 | Galileo: E1, E5b, | BeiDou: B1, B2a | SBAS: L1
Update Rate	100 Hz	

CAN Bus

CAN	
Baud Rate	Selectable up to 1 Mbit/s
Termination	User controlled 120 Ohm
Output Rate	100 Hz
Output Latency	20 ms

CAN FD	
Baud Rate	Selectable up to 1 Mbit/s
Data Rate	Selectable up to 5 Mbit/s
Termination	User controlled 120 Ohm
Max. Capture Rate	Unlimited

Mechanical

Power	
Input Voltage Rate	7-30 V DC
Max. Consumption	<9 W

Environment	
Operating Temperature	-20°C to +70°C
Storage Temperature	-30°C to +80°C

Physical	
Size	186 x 126 x 52 mm
Weight	Approx. 950g

Inputs and Outputs

Analogue Input	
Number of Channels	4
Update Rate	500 Hz
Input Range	±50 V
DC Accuracy	±2 mV (calibrated at 23°C)
Channel Sample Order	Synchronous

Analogue Output	
Voltage Range	0-5 V DC
Update Rate	100 Hz

Digital Output	
Frequency	DC to 44.4 KHz
Update Rate	100 Hz

* Specifications will vary depending on the number of satellites used, obstructions, satellite geometry (PDOP), multipath effects, and atmospheric conditions. For maximum system accuracy, always follow best practices for GNSS data collection.

Feature not compatible with **VBOX 4 single antenna system

VBOX AUTOMOTIVE

Additional Services

VBOX AUTOMOTIVE prides itself on delivering complete solutions to customers. Designed and manufactured by in-house engineers, every **VBOX** is conceived and developed with the end-user in mind. This attention to detail and customer focus doesn't end when ownership starts.

- **Free Lifetime Support** - Exceptional customer support is provided free of charge with no support contracts, including all future firmware/software updates
- **Calibration Service** - **RACELOGIC** is an accredited ISO calibration laboratory and offer a reliable and fast calibration service including ISO 17025
- **Global Distributor Partners** – A global network of sales and service partners provide a local point of contact for product information, support and sales

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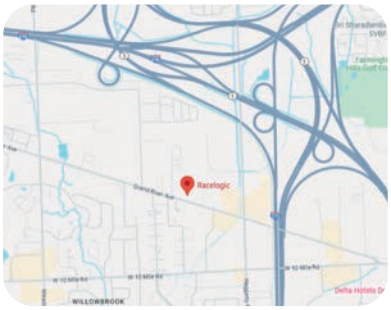
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